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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco, California

December 13, 2010

Joseph A. Drazek
Quarles & Brady LLP
One Renaissance Square
Two North Central Avenue
Phoenix, AZ 85004-2391

Bethany Dreyfus
U.S. Environmental Protection Agency
Region IX (ORC-3)
75 Hawthorne Street
San Francisco, CA 94105

Re: Decision of EPA Region IX's Superfund Division Director
Resolving Crane Co.'s Dispute of Installation of Northeast Injection Wells
Phoenix-Goodyear Airport (North) Superfund Site

Dear Mr. Drazek and Ms. Dreyfus:

This letter sets forth the final administrative decision of the U.S. Environmental Protection Agency (EPA) in the formal dispute regarding the installation of 2 injection wells at the PGA-North Superfund Site (PGA-North or Site). Under the April 2006 Partial Consent Decree (CD), Crane Co. has disputed EPA's requirement to install 2 additional injection wells as part of a hydraulic barrier in the northeast area of PGA-North. Crane Co. asserts that EPA's requirement to install these wells is "not technically defensible and is arbitrary." After considering the facts and arguments made, I have determined that EPA's requirement to install the 2 wells was neither arbitrary nor capricious, and that this requirement serves the purpose of the remedy to protect human health and the environment. The 2 injection wells are warranted to assure control of plume migration given regional hydrologic complexities and real threats to municipal water supplies.

The formal dispute was raised under Paragraph 88 of the CD for "disputes pertaining to the selection or adequacy of any response action." Pursuant to Paragraph 88.d., Crane Co. had the burden to demonstrate that EPA's decision was "arbitrary and capricious or otherwise not in accordance with law." In accordance with Paragraph 88.b. of the CD, Crane Co. submitted a Statement of Position (SOP) on September 27, 2010; EPA submitted its SOP on October 18, 2010; and Crane Co. submitted a Reply on October 25, 2010. Through these documents and the Administrative Record, Crane Co. has not met its burden.

EPA has provided ample justification for the installation of 5 wells to form a hydraulic barrier along Dysart Road to prevent the contaminated groundwater plume from continuing to threaten nearby domestic supply wells. The injection system is one part of the strategy, in concert with extraction, to prevent the groundwater plume from moving further to the northeast. Placing the injection system downgradient of the contaminated plume will inject clean water into the aquifer, increasing the hydraulic gradient, thereby preventing the plume's continued movement in that direction. The injection system is also intended to optimize cleanup by directing contamination back toward the extraction wells for treatment. With an appropriate number of injection wells, including the 2 in dispute, the flow from each well can be adjusted to address flow direction shifts in the future, which is particularly important due to shifting regional pumping patterns and seasonal groundwater flow changes in this area.

The record contains substantial discussion between EPA and Crane Co. dating back to May 2009 about the appropriate number of injection wells to create a sufficient hydraulic barrier. A hydraulic barrier must create overlapping mounding to prevent contamination from moving past the line of injection. In its SOP, EPA shows calculations that indicate that the radius of influence of 3 injection wells would not be large enough to cover the distances between the wells with sufficient confidence in future groundwater flow scenarios and would not provide sufficient flexibility to respond to future influences on groundwater flow in this area. In its SOP and Reply, Crane Co. argued that a barrier with 3 injection wells particularly paired with the new extraction system, EA-07 would be sufficient for plume containment and that those 3 wells could provide adequate operational flexibility for the system. Crane Co.'s analysis relies on information about the Site from the past 2 years, data obtained from the first several weeks of operation of the first 2 injection wells along Dysart Road, and the unfinished groundwater flow model for the Site. Although Crane Co.'s SOP and Reply indicate that a combination of 3 injection wells with EA-07 could potentially provide an adequate barrier under certain flow conditions, EPA's SOP shows that there is a great deal of uncertainty about that area of the plume, such that EPA must be conservative in evaluating whether the injection wells are able to maintain a full hydraulic barrier under conditions of outside stresses on the aquifer.

Since EPA's April 2010 request for the 5 injection wells,[1] Crane Co. installed 3 of these wells, 2 of which were operating by late August 2010. EPA and Crane Co. used the data gathered during

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[1] Crane Co. asserts that EPA retrospectively justified its decision for a five injection well barrier because technical memoranda supporting this conclusion were produced in August and October, 2010. The record is clear that the arguments supporting the five wells had been made since at least May 2009 during meetings that included both EPA and Crane Co. As Crane Co continued to argue that 5 wells were not necessary, EPA continued to evaluate Crane Co.'s arguments, giving full consideration to Crane Co.'s position throughout the process. This was consistent with the process followed for all of the requirements in EPA's April 2010 letter. Notably, it appears from the record that, after discussion with Crane Co. and during informal dispute resolution, EPA changed some of its requirements contained in the April 2010

the first few weeks of injection in their respective SOPs and arrive at very different conclusions. Although it is helpful to have information about the initial injection well operation, there is not sufficient information about the northeast area to rely on that analysis exclusively. Because of the proximity to domestic water supplies, EPA cannot afford to wait until this analysis is borne out to determine whether a full set of wells is necessary. Drinking water supply wells are just ¼ mile to the east of the current plume boundary, and as is shown in the map provided as Attachment 2 to EPA's SOP, the plume has grown significantly over the last 5 years toward those resources. Thus, the robust hydraulic barrier is necessary to ensure that, regardless of the flow changes, the plume will not advance further toward those drinking water resources.

The groundwater flow model used for much of Crane Co.'s analysis is still incomplete, and the information used to populate the model is still too limited to make it reliable for predicting the impacts of additional extraction or injection wells. Although significant work has been conducted in the northeast over the past 4 years to characterize that contamination and create a Site-specific model, the 9 shallow groundwater wells installed in that area to date have not proven sufficient to fully characterize that portion of the plume. Modeling based on that information has not proven accurate, exemplified by the fact that two extraction wells EA-05 and EA-06 installed over 2 years ago did not accomplish the capture that initial calculations using the model claimed they would. Therefore, any prediction based on the Site-specific model is limited, and any action taken at this point must be conservative to ensure that the remediation installed is effective.

Citing a lack of information, Crane Co. urges EPA to defer its determination of the number of injection wells necessary for the hydraulic barrier until more data are obtained following the operation of EA-07 and 3 of the injection wells.[2] Crane Co. offers in its Reply that "[i]f future field data suggest that conditions are changing and the hydraulic barrier is becoming less effective, Crane Co. will take the necessary steps to augment the system to continue to protect local water supplies." However, it could take significant time after field data are available to understand that the barrier is not fully effective, and then to install additional injection wells. Considering that domestic supply wells are within ¼ mile east of the current plume boundary, in this time contamination could pass beyond the 3 wells, threatening or impacting the domestic water supply.

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letter in response to Crane Co.'s recommendations. For the remaining requirements, EPA conducted thorough analysis of the requirements and Crane Co.'s arguments. The technical memoranda, including the August and October documents, provide additional support, but are not the sole support, for EPA's requirements.

[2] Despite Crane Co.'s statements to the contrary, EPA did account for the future operation of EA-07 in its determination that 5 injection wells are necessary. As explained in EPA's SOP, because EA-07 is in the interior of the plume, it cannot be relied on for full plume capture.

In its SOP and Reply, Crane Co. challenged EPA's technical analyses, contending that a correct computation of the radius of influence of the 3 and 5 well scenarios would show that 3 wells would provide a larger barrier considering the finite volume of water available. Crane Co.'s analysis assumed that mounding is calculated in a linear fashion with an equal amount of water injected into each of the injection wells. However, optimized management of the system would involve injection of variable amounts of water into each well depending upon groundwater flow conditions. The larger number of injection locations provides for greater variability in mound configuration. With more injection locations, the injected water can be reallocated to optimize containment of the plume based on future shifts in groundwater flow direction and gradient, thereby providing greater assurance that the drinking water supply is protected.

In sum, I am supporting the requirement for the installation of the remaining 2 injection wells in the northeast of the PGA-North Subunit A groundwater contamination plume. This aggressive approach is necessary to protect the nearby water supplies and to effectively conduct aquifer restoration. This decision is based on the documents set forth in the Administrative Record of this Dispute, including the SOPs and Reply. Consistent with Paragraph 88.b. of the CD, this letter formally documents my decision, and its issuance serves as the final administrative decision resolving the dispute.

Sincerely,

Jane Diamond
Director, Superfund Division

cc: Henry Friedman, U.S. DOJ
Catherine Brown, EPA
Clancy Tenley, EPA (via email)
David Wood, EPA (via email)
Nicole Coronado, ADEQ
Anthony D. Pantaleoni, Crane Co.
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